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10/574,960	12/22/2006	Dimiter Hadjiev	403682/WEINSTEIN	8440
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LEYDIG VOIT & MAYER, LTD			ALLEN, CAMERON J	
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SUITE 300			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20005-3960			1797	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/574,960	HADJIEV ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	CAMERON J. ALLEN	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 07 April 2006.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-46 and 49 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-14, 16-23, 26-30, 32-38, 40-41, 44, 46, and 49 is/are rejected.  
 7) Claim(s) 15,24,25,31,39,42,43 and 45 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 22 December 2006 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/07/2006</u> .   | 6) <input type="checkbox"/> Other: _____ .                        |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-9, 12, 13, 18, 19, 22, 23, 29, 33, 41, and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Dziewinski et al US 6,030,520.

Regarding claim 1, Dziewinski discloses a method for chemically treating a liquid medium loaded with nitrates, comprising contacting zinc with said liquid medium, wherein the liquid medium has a pH less than 4. (Column 3 line 5-6)(Column 4 line 47-48)

Regarding claim 2, Dziewinski discloses the method according to claim 1, further comprising maintaining the pH of said liquid medium by a regular adjustment with the addition of acid to the liquid medium. (Column 4 line 43-44)

Regarding claim 3, Dziewinski discloses the method according to claim 2, wherein the acid is hydrochloric acid. (Column 6 line 30-31)

Regarding claim 5, Dziewinski discloses the method according to claim 1, wherein the temperature liquid medium has a temperature greater than 20°C during

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contacting. (Column 6 line 66-67) The Examiner interprets 20 degree C to be ambient temperature.

Regarding claim 6, Dziewinski discloses the method according to claim 1, wherein the temperature of the liquid medium has a temperature of approximately 20°C. (Column 6 line 66-67)

Regarding claim 7, Dziewinski discloses the method according to claim 1, wherein the zinc is in the form of a powder. (Column 3 line 65)

Regarding claim 8, Dziewinski discloses the method according to claim 7, herein the zinc and the nitrates in solution have a weight ratio of at least 5. (Column 3 line 42)

Regarding claim 9, Dziewinski discloses the method according to claim 7 wherein the liquid medium is stirred. (Column 3 line 67)

Regarding claim 12, Dziewinski discloses the method according to claim 1 wherein the liquid medium has an initial concentration of nitrates greater than 25 mg/L. (Column 3 line 2)

Regarding claim 13, Dziewinski discloses the method according to claim 1, wherein the liquid medium has an initial concentration of nitrates greater than 50 mg/L. (Column 3 line 2)

Regarding claim 18, Dziewinski discloses the method according to claim 1, wherein the liquid medium is drainage water. (Column 2 line 51) The Examiner interprets Agricultural waste streams to include drainage water.

Regarding claim 19, Dziewinski discloses the method according to claim 18, wherein the drainage water has a concentration of nitrates greater than 1 g/L. (Column

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3 line 2)

Regarding claim 22, Dziewinski discloses the method according to claim 1, comprising treating the liquid medium by electrolysis. (Column 8 line 38)

Regarding claim 23, Dziewinski discloses the method according to claim 22, wherein the electrolysis causes the liquid medium to circulate in at least one electrolysis cell in which a current circulates between, an anodic electrode and a cathodic electrode. (Column 5 lines 48-50)

Regarding claim 27, Dziewinski discloses the method according to claim 22 further comprising maintaining a pH of the liquid medium above 5 during the entire electrolysis step. (Column 4 lines 45-48)

Regarding claim 29, Dziewinski discloses the device capable of chemically treating a liquid medium loaded with nitrates and with a pH is less than 4 comprising: at least one liquid nitrate reduction enclosure (Column 5 lines 22-27), which comprises a liquid inlet(Column 5 line 22) The examiner interprets continuous to have an inlet and outlet, at least one zinc layer(Column 3 line 6 ), a means for the circulation of said liquid medium, through said zinc layer (Column 5 line 23), and a liquid medium outlet of the enclosure (Column 7 line 31) (Column 5 line 22) The examiner interprets continuous to have an inlet and outlet.

Regarding claim 33, Dziewinski discloses the device according to claim 29 wherein the enclosure comprises a system for stirring the liquid capable of stirring the liquid circulating in the enclosure above each zinc layer by forming a corresponding stirring zone. (Column 5 line 25)

Regarding claim 40, Dziewinski discloses the device according claim 29 comprising a zinc reduction enclosure in which the liquid circulates at the outlet of the nitrate reduction enclosure. (Column 5 lines 38-51)

Regarding claim 41, Dziewinski discloses the device according to claim 40, wherein the zinc reduction enclosure comprises at least one electrolysis cell. (Column 5 line 49)

Regarding claim 46, Dziewinski discloses the device according to claim 40, comprising a pH regulator that it maintains the liquid medium circulating in the zinc reduction enclosure at a pH above 7. (Column 4 lines 45-48)

Claims 29, 30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Heskett US 5,951,869.

Regarding claim 29, Heskett discloses the device capable of chemically treating a liquid medium loaded with nitrates and with a pH is less than 4 comprising: at least one liquid nitrate reduction enclosure (Column 7 line 37), which comprises a liquid inlet(Column 8 line 1) at least one zinc layer(Column 14 line 6 Abstract), a means for the circulation of said liquid medium, through said zinc layer (Column 17 line 24-29), and a liquid medium outlet of the enclosure (Column 7 line 31)

Regarding claim 30, Heskett discloses the device according to claim 29, further comprising at least one pH regulator, capable of maintaining the liquid medium at a pH of less than 4. (Column 4 lines 21-30)

Regarding claim 32, Heskett discloses the device according to one of claim 29, wherein each zinc layer has a height less than 10 cm. (Column 15 line 44)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 11, 20-21, 26, 28, 34, 38, 44 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dziewinski as applied above in claim 1 and 22.

Regarding claim 4, Dziewinski discloses the method according to claim 2 but does not disclose wherein the pH adjustment is carried out at least every half hour throughout the treatment. Dziewinski does disclose adjustment of the pH as necessary throughout the treatment. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the pH every half hour since it has been held, that where the general conditions exist in the prior art, it is within routine skill in the art to find or discover the optimum or workable range.

Regarding claim 11, Dziewinski discloses the method according to claim 9 but does not disclose wherein the liquid medium is stirred at a speed of at least 0.55 m/s. It does disclose that the medium is stirred. (Column 3 line 67) It would have been obvious to one of ordinary skill in the art at the time of the invention to stir the medium at least 0.55 m/s, since it has been held that where the general conditions exist in the prior art that it is within the ordinary skill of one in the art to find or discover the optimum or workable range.

Regarding claim 20, Dziewinski discloses the method according to claim 1, but does not disclose wherein the liquid medium in contact with the zinc has a flow rate of circulation greater than 0.005 m/s. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a flow rate of circulation greater than 0.005 m/s, since it has been held that where the general conditions exist in the prior art that it

is within the ordinary skill of one in the art to find or discover the optimum or workable range.

Regarding claim 21, Dziewinski discloses the method according to Claim 20, wherein the flow rate of circulation of the liquid medium in contact with the zinc is approximately 0.01 m/s. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a flow rate of circulation is approximately 0.01 m/s, since it has been held that where the general conditions exist in the prior art that it is within the ordinary skill of one in the art to find or discover the optimum or workable range.

Regarding claim 26, Dziewinski discloses the method according to claim 23, wherein the liquid medium circulates in at least six electrolysis cells. It would have been obvious to one of ordinary skill in the art at the time of the invention to use six electrolysis cells, since it has been held that mere duplication of parts is within the ordinary skill of one in the art, and one would expect to receive the added benefit of increased treatment.

Regarding claim 28, Dziewinski discloses the method according to claim 23, wherein electrolysis includes applying a potential between the anodic electrode and cathodic electrode but does not disclose it is approximately 2 volts for a current intensity between 1.5 and 1.8 amperes per L of solution treated. It would have been obvious to one of ordinary skill in the art at the time of the invention to use approximately 2 volts for a current intensity between 1.5 and 1.8 amperes per L of solution treated, since it has

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been held that where the general conditions exist in the prior art that it is within the ordinary skill of one in the art to find or discover the optimum or workable range.

Regarding claim 34, Dziewinski discloses the device according to claim 33, but does not disclose wherein the liquid in each stirring zone has a stirring speed of 0.85 m/s. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a stirring speed of 0.85 m/s, since it has been held that where the general condition exist in the prior art, it is within the ordinary skill of one in the art to find or discover the optimum or workable ranges.

Regarding claim 38, Dziewinski discloses the device according to claim 29 wherein the liquid in the enclosure has a circulation speed of approximately 0.01 m/s. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a stirring speed of 0.01 m/s, since it has been held that where the general condition exist in the prior art, it is within the ordinary skill of one in the art to find or discover the optimum or workable ranges.

Regarding claim 44, Dziewinski discloses the device according to claim 41, wherein the zinc reduction enclosure comprises at least three electrolysis cells. It would have been obvious to one of ordinary skill in the art at the time of the invention to use three electrolysis cells, since it has been held that mere duplication of parts is within the ordinary skill of one in the art, and one would expect to receive the added benefit of increased treatment.

Regarding claim 49, Dziewinski discloses a method according to claim 22, further comprising maintaining a pH of 10 in the liquid medium during the entire electrolysis step. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a pH of 10, since it has been held that where the general condition exist in the prior art, it is within the ordinary skill of one in the art to find or discover the optimum or workable ranges

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dziewinski as applied above in claim 9 in further view of Davies US 4,283,290.

Regarding claim 10, Dziewinski discloses the method according to claim 9, but does not disclose wherein the stirring is carried out by pulses or by static mixers. Davies does disclose the use of a static mixer in water treatment for mixing solutions or emulsions. (Davies Column 10 line 36) It would have been obvious to one of ordinary skill in the art at the time of the invention to use the static mixer in the Davies reference, since replacement of the mixer in the Dziewinski reference with the mixer in Davis reference will yield the added benefit of mixing and solving the problem of having an unmixed solution.

Claims 14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dziewinski as applied above in claim 1 in further view of Haishi US 5,093,099.

Regarding claim 14, Dziewinski discloses the method according to claim 1, but does not disclose wherein the zinc is in the form of chips. Haishi does disclose the use

of zinc catalyst in the form of chips. (Abstract) It would have been obvious to one of ordinary skill in the art at the time of the invention to use the zinc catalyst in the form of a flake, since it is known to be an effective way of deliver a catalyst and it would achieve the added benefit of catalytic effect.

Regarding claim 16, Dziewinski in view of Haishi discloses the method according to claim 14 wherein the zinc and the liquid medium have a surface area between them of at least 0.0156 m<sup>2</sup>/L. The Examiner interprets the surface area to be an inherent property to the shape of the catalyst.

Regarding claim 17, Dziewinski in view of Haishi discloses the method according to claim 16, wherein the contact surface area between the zinc and the liquid medium is approximately 0.25 m;<sup>2</sup>/L. The Examiner interprets the surface area to be an inherent property to the shape of the catalyst.

Claims 35 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dziewinski as applied above in claim 33 in further view of Heskett US 5,951,869.

Regarding claim 35, Dziewinski discloses the device according to claim 33 but does not disclose wherein at least one stirring zone out of two is connected to pH regulator. It does disclose the use of pH adjustment/regulation is performed as necessary. Heskett does disclose the use of a ph regulator at the inlet for use in treating nitrate solutions. (Column4 line 20-27) It would have been obvious to one of ordinary skill in the to locate the pH regulation means in conjunction with at least one

stirring zone, since Heskett disclose this arrangement yields the added benefit of being more responsive.

Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dziewinski in further view of Heskett as applied above in claim 35, in further view of Roberts US 2005/0183964 A1

Regarding claim 36, Dziewinski in view of Heskett discloses the device according to claim 35, but does not disclose wherein the pH regulator comprises at least one probe that measures the pH in the corresponding stirring zone a control enclosure and an acid circulation pump. Roberts does disclose the use of a pH sensor and probe apparatus. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the ph sensor and probe, since it would yield the added benefit of being able to detect the pH at the location of the probe. (Roberts 0272)

Regarding claim 37, Dziewinski in view of Heskett in further view of Roberts discloses the device according to claim 36, wherein the pH regulator maintains pH between 2 and 3 the corresponding stirring zone between 2 and 3. (Dziewinski Column 4 line 48)

#### ***Allowable Subject Matter***

Claims 15, 24, 25, 31, 39, 42, 43, and 45 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not appear to disclose the use of compressed zinc chips between two perforated plates or degreasing and rinsing of the chips.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAMERON J. ALLEN whose telephone number is (571)270-3164. The examiner can normally be reached on M-Th 9-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Walter D. Griffin/  
Supervisory Patent Examiner, Art Unit 1797